

Appl. No. 10/525,525  
Amendment dated: October 1, 2009  
Reply to OA of: July 1, 2009

This listing of claims will replace all prior versions and listings of claims in the application.

**Listing of Claims:**

1-36. (cancelled)

37(new). A thermal transfer type image recording apparatus for forming an image on a sheet-shaped recording medium using a thermal head, the image recording apparatus comprising:

a frictional carrier drum that is rotated in synchronous relation with a thermal transfer process, the entire surface of at least a portion thereof with which the recording medium comes in contact being covered with an elastic member, such as rubber;

a recording medium guiding mechanism for guiding the recording medium toward the frictional carrier drum; and

one or more auxiliary carrier members for feeding the recording medium with rotation of the frictional carrier drum in such a way at least a part of the recording medium comes into close contact with the carrier drum,

wherein a friction coefficient between the frictional carrier drum and the recording medium and a friction coefficient between the recording medium and the auxiliary carrier members is set such that a ratio of the friction coefficient between the recording medium and the auxiliary carrier members to the friction coefficient between the frictional carrier drum and the recording medium is set to be 35% or less,

wherein the contact length between the recording medium and the frictional carrier drum is a quarter or more of an outer circumference of the frictional carrier drum, and

wherein an allowable deviation amount of a slip generated between the recording medium and the frictional carrier drum is kept within 75 mm.

38(new). A thermal transfer type image recording apparatus for forming an image on a sheet-shaped recording medium using a thermal head, the image recording apparatus comprising:

- a frictional carrier drum that is rotated corresponding to a thermal transfer process;

- a recording medium guiding mechanism for guiding the recording medium to be fed toward the frictional carrier drum;

- one or more auxiliary carrier members for feeding the recording medium with rotation of the frictional carrier drum in such a way at least a part of the recording medium comes into close contact with the carrier drum,

- bringing at least a part of the recording medium into contact with the frictional carrier drum and for rotating the recording medium together with the frictional carrier drum;

- a detector for detecting whether the recording medium passes through a predetermined position; and

- output control means for allowing the thermal head to generate heat in accordance with an output from the detector.

wherein the auxiliary carrier members are formed at four or more positions on a sheet feed roller of the outer circumferential surface of the frictional carrier drum.

wherein, after the output from the detector, the output control means allows the thermal head to generate heat after time corresponding to a distance from the detector to the thermal head passes.

wherein the output control means predicts a slip of the recording medium with reference to at least one of the kind and size of the recording medium, and an increase and decrease in tension of the ribbon, and finely adjusts the heating timing of the thermal head based on the slip.

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39(new). The image recording apparatus according to claim 37, further comprising a ribbon passing through between the thermal head and the frictional carrier drum,  
wherein the thermal head heats the ribbon and transfers a color material from the ribbon to the recording medium.

40(new). The image recording apparatus according to claim 38, further comprising a ribbon passing through between the thermal head and the frictional carrier drum,  
wherein the thermal head heats the ribbon and transfers a color material from the ribbon to the recording medium.

41(new). The image recording apparatus according to claim 37, wherein the auxiliary carrier members are formed at four or more positions on the frictional carrier drum.

42(new). The image recording apparatus according to claim 38, wherein the detector is provided close to the thermal head.

43(new). The image recording apparatus according to claim 38, wherein the output control means estimates the increase and decrease in tension of the ribbon based on a pulse period of an encoder operatively associated with the amount of the ribbon taken out, and predicts the slip in accordance with the increase and decrease in tension of the ribbon.

44(new). The image recording apparatus according to claim 38, wherein the output control means predicts the slip with reference to a data table previously stored.

45(new). The image recording apparatus according to claims 37, wherein the recording medium includes a thermal transfer dedicated paper, a normal paper, a label paper, a transparent film, a thermal recording paper, and a thermal color recording paper.

46(new). The image recording apparatus according to claim 38, wherein the recording medium includes a thermal transfer dedicated paper, a normal paper, a label paper, a transparent film, a thermal recording paper, and a thermal color recording paper.

47(new). The image recording apparatus according to claim 37, wherein the auxiliary carrier members include plate-shaped or spiral-shaped elastic members.

48(new). The image recording apparatus according to claim 38, wherein the auxiliary carrier members include plate-shaped or spiral-shaped elastic members.

49(new). The image recording apparatus according to claim 37, wherein the auxiliary carrier member further comprise a function for guiding the movement of the recording medium in the rotating direction of the frictional carrier drum.

50(new). The image recording apparatus according to claim 38, wherein the auxiliary carrier member further comprise a function for guiding the movement of the recording medium in the rotating direction of the frictional carrier drum.

51(new). The image recording apparatus according to claim 37, wherein the auxiliary carrier member selects any pressure to keep close contact of the recording medium against the frictional carrier drum, depending on different recording mediums.

52(new). The image recording apparatus according to claim 38, wherein the auxiliary carrier member selects any pressure to keep close contact of the recording medium against the frictional carrier drum, depending on different recording mediums.

53(new). The image recording apparatus according to claim 37, wherein the auxiliary carrier member is designed to select any pressure to keep close contact of the recording medium against the frictional carrier drum, depending on different recording mediums, and

wherein a link mechanism is further provided for determining any pressure common to the plurality of auxiliary carrier members to keep the recording medium in close contact with the frictional carrier drum,

the link mechanism comprising:

a ring-shaped member whose the inner circumference is provided with a plurality of cam surfaces and which can rotate in a circumferential direction;

a plurality of elastic members for generating biasing force for pressing the plurality of auxiliary carrier members toward the frictional carrier drum, respectively; and

a plurality of cam followers which is moved in a diametrical direction of the ring-shaped member along the plurality of cam surfaces, respectively, and which sets the biasing force to a plurality of steps by expanding and compressing the respective elastic members, or

the link mechanism comprises:

elastic members for generating biasing force for pressing the plurality of auxiliary carrier members arranged around the frictional carrier drum against the frictional carrier drum, respectively;

a plurality of levers which is rotatably arranged in the vicinity of the plurality of auxiliary carrier members and which expands and compresses the elastic members; and

one or more connecting members for mutually connecting the levers.

54(new). The image recording apparatus according to claim 38, wherein the auxiliary carrier member is designed to select any pressure to keep close contact of the recording medium against the frictional carrier drum, depending on different recording mediums, and wherein a link mechanism is further provided for determining any pressure common to the plurality of auxiliary carrier members to keep the recording medium in close contact with the frictional carrier drum, the link mechanism comprising:

- a ring-shaped member whose the inner circumference is provided with a plurality of cam surfaces and which can rotate in a circumferential direction;

- a plurality of elastic members for generating biasing force for pressing the plurality of auxiliary carrier members toward the frictional carrier drum, respectively; and

- a plurality of cam followers which is moved in a diametrical direction of the ring-shaped member along the plurality of cam surfaces, respectively, and which sets the biasing force to a plurality of steps by expanding and compressing the respective elastic members, or

- the link mechanism comprises:

- elastic members for generating biasing force for pressing the plurality of auxiliary carrier members arranged around the frictional carrier drum against the frictional carrier drum, respectively;

- a plurality of levers which is rotatably arranged in the vicinity of the plurality of auxiliary carrier members and which expands and compresses the elastic members; and

- one or more connecting members for mutually connecting the levers.

55(new). The image recording apparatus according to claim 38, wherein the output control means predicts the slip with reference to a data table previously stored.